

Name:

Answers

Given the two functions  $f(x) = x^2 - 4$  and  $g(x) = x - 3$ :

<p>1. Evaluate <math>(f + g)(x)</math></p> $\begin{aligned} x^2 - 4 + x - 3 \\ x^2 + x - 7 \end{aligned}$	<p>2. Evaluate <math>(f + g)(2)</math></p> $\begin{aligned} (2)^2 - 4 + 2 - 3 \\ 4 - 4 + 2 - 3 \\ -1 \end{aligned}$
<p>3. Evaluate <math>f(x) - g(x)</math></p> $\begin{aligned} x^2 - 4 - (x - 3) \\ x^2 - 4 - x + 3 \\ x^2 - x - 1 \end{aligned}$	<p>4. Evaluate <math>f(4) - g(4)</math></p> $\begin{aligned} 4^2 - 4 - 1 \\ 11 \end{aligned}$
<p>5. Evaluate <math>(g - f)(x)</math></p> $\begin{aligned} x - 3 - (x^2 - 4) \\ x - 3 - x^2 + 4 \\ -x^2 + x + 1 \end{aligned}$	<p>6. Evaluate <math>(g - f)(5)</math></p> $\begin{aligned} -(5)^2 + 5 + 1 \\ -25 + 5 + 1 \\ -19 \end{aligned}$
<p>7. Evaluate <math>f(x) \cdot g(x)</math></p> $\begin{aligned} (x^2 - 4)(x - 3) \\ x^3 - 3x^2 - 4x + 12 \end{aligned}$	<p>8. Evaluate <math>f(3) \cdot g(3)</math></p> $\begin{aligned} (3)^3 - 3(3)^2 - 4(3) + 12 \\ 27 - 27 - 12 + 12 \\ 0 \end{aligned}$
<p>9. Evaluate <math>\left(\frac{f}{g}\right)(x)</math></p> $\frac{x^2 - 4}{x - 3}$	<p>10. Evaluate <math>\left(\frac{f}{g}\right)(-1)</math></p> $\frac{(-1)^2 - 4}{-1 - 3} = \frac{-3}{-4} = \frac{3}{4}$

11. Evaluate  $f(g(x))$

$$\begin{aligned}(x-3)^2 - 4 \\ x^2 - 6x + 9 - 4 \\ x^2 - 6x + 5\end{aligned}$$

12. Evaluate  $f(g(-1))$

$$\begin{aligned}(-1)^2 - 6(-1) + 5 \\ 1 + 6 + 5 \\ 11\end{aligned}$$

13. Evaluate  $(g \circ f)(x)$

$$\begin{aligned}x^2 - 4 - 3 \\ x^2 - 7\end{aligned}$$

14. Evaluate  $(g \circ f)(0)$

$$\begin{aligned}0^2 - 7 \\ -7\end{aligned}$$

15. Evaluate  $f(f(x))$

$$\begin{aligned}(x^2 - 4)^2 - 4 \\ x^4 - 8x^2 + 16 - 4 \\ x^4 - 8x^2 + 12\end{aligned}$$

16. Evaluate  $f(f(-2))$

$$\begin{aligned}(-2)^4 - 8(-2)^2 + 12 \\ 16 - 32 + 12 \\ -4\end{aligned}$$

17. Evaluate  $(g \circ g)(x)$

$$\begin{aligned}(x-3) - 3 \\ x - 6\end{aligned}$$

18. Evaluate  $(g \circ g)(5)$

$$\begin{aligned}5 - 6 \\ -1\end{aligned}$$

19. State the domain and range of  $f(x)$

$f(x) = x^2 - 4$   
 $x = \frac{0}{2(1)} = 0$   
 $f(0) = -4$   
 $D: (-\infty, \infty)$   
 $R: [-4, \infty)$

$f(x)$  has vertex  $x$   $V(0, -4)$

20. State the domain and range of  $g(x)$

$$\begin{aligned}g(x) &= x - 3 \\ D: &(-\infty, \infty) \\ R: &(-\infty, \infty)\end{aligned}$$

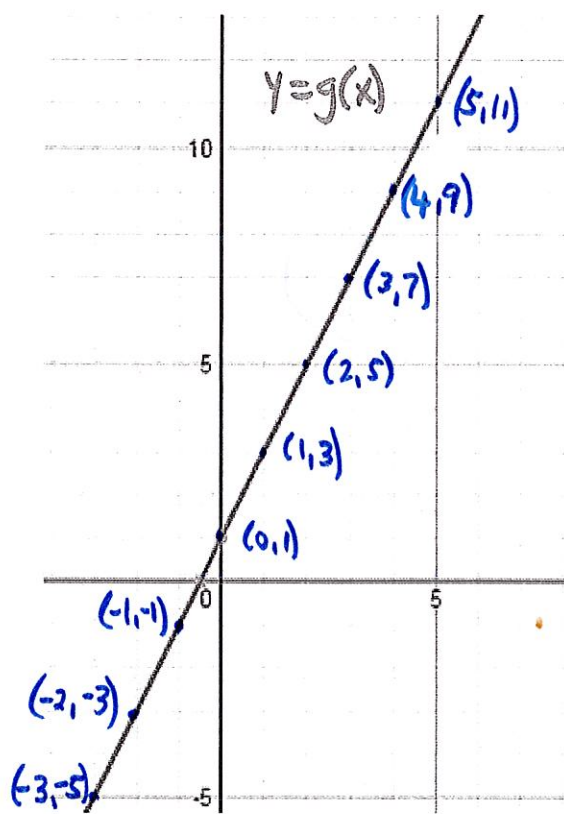
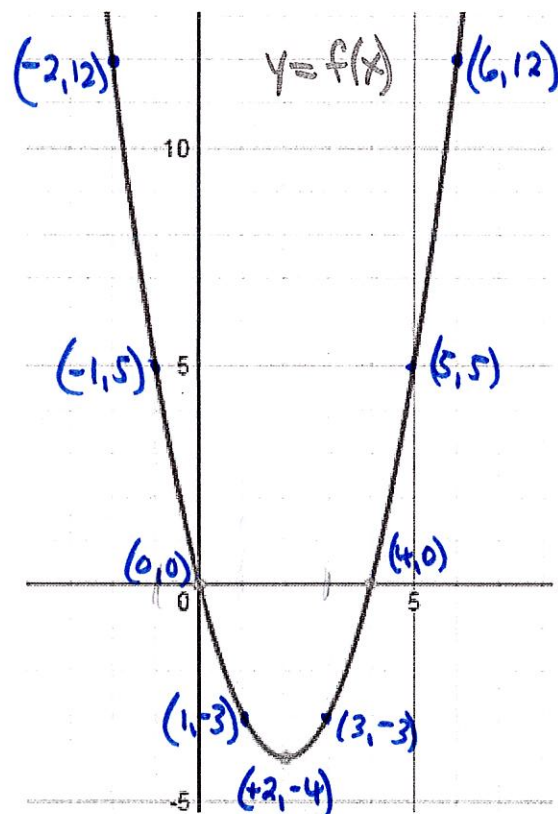
21. State the domain and range of  $f(g(x))$

$$\begin{aligned}f(g(x)) &= x^2 - 6x + 5 \\ \text{axis } x &= \frac{6}{2} = 3 \\ f(g(3)) &= (3)^2 - 6(3) + 5 = -4 \\ V(3, -4) \\ D: &(-\infty, \infty) \\ R: &[-4, \infty)\end{aligned}$$

22. State the domain and range of  $g(f(x))$

$$\begin{aligned}g(f(x)) &= x^2 - 7 \\ \text{axis } x &= 0 \quad g(f(0)) = -7 \\ V(0, -7) \quad D: &(-\infty, \infty) \\ R: &[-7, \infty)\end{aligned}$$

Use the graphs of  $y = f(x)$  and  $y = g(x)$  shown below to answer the questions 23 through 32



<p>23. Evaluate <math>(f + g)(0)</math></p> <p><math>f(0) + g(0) = 0 + 1 = 1</math></p>	<p>24. Evaluate <math>(g \circ f)(0)</math></p> <p><math>g(f(0)) = g(0) = 1</math></p>
<p>25. Evaluate <math>f(-1) - g(-1)</math></p> <p><math>5 - (-1)</math> 6</p>	<p>26. Evaluate <math>(g \circ f)(-1)</math></p> <p><math>g(f(-1)) = g(5) = 11</math></p>
<p>27. Evaluate <math>f(g(0))</math></p> <p><math>f(1) = -3</math></p>	<p>28. Evaluate <math>f(g(2)) = f(5) = 5</math></p> <p><del><math>f(5) = 5</math></del></p>
<p>29. Evaluate <math>f(-2) \cdot g(-2)</math></p> <p><math>(12)(-3)</math> -36</p>	<p>30. Evaluate <math>f(6) \cdot g(6)</math></p> <p><math>(12)(13)</math></p>
<p>31. Evaluate <math>\left(\frac{f}{g}\right)(5) = \frac{5}{11}</math></p>	<p>32. Evaluate <math>\left(\frac{f}{g}\right)(-3) = \frac{21}{-5}</math></p>

$$(1, 2)$$

$$(1, 3)$$

$$(1, 4)$$

$$(1, 5)$$

$$(1, 6)$$

$$(1, 7)$$

$$(1, 8)$$

$$(1, 9)$$

$$(1, 10)$$

$$1 = (1) \cdot 1 = (1) \cdot 1 \cdot 1$$

$$11 = (1) \cdot 11 = (1) \cdot 11 \cdot 1$$

$$1 = (1) \cdot 1 =$$

$$(1) \cdot (1)$$

$$\frac{1}{1} =$$

$$(1, 1)$$

$$(1, 1)$$

$$(1, 1)$$

$$(1, 1)$$

$$(1, 1)$$

$$(1, 1)$$

$$(1, 1)$$

$$(1, 1)$$

$$(1, 1)$$

$$1 = 1 + 0 = (1) \cdot 1 + (0) \cdot 1$$

$$1 = 1$$

$$1 = 1$$

$$(1) \cdot (1)$$

$$\frac{1}{1} =$$